CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 97-068

CEASE AND DESIST ORDER

THE TOSCO REFINING COMPANY
SAN FRANCISCO AREA REFINERY
RODEO, CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Regional Board) finds that:

1. On January 19, 1994 the Regional Board issued Cease and Desist Order (CDO) No. 94-015 to Shell Oil Company (Shell), Union Oil Company of California (Unocal), and Exxon Company, U.S.A. (Exxon). CDO No. 94-015 required, among other actions, that the three refineries comply with specific selenium discharge limitations no later than July 31, 1998.

2. On September 21, 1994, the Regional Board issued Order No. 94-129 (NPDES No. CA0005053) for Union Oil Company of California's San Francisco Refinery in Rodeo.

3. On April 1, 1997 the Tosco Refining Company (Tosco), hereinafter referred to as the discharger, acquired Unocal's refinery, and assumed all responsibilities and liabilities under the NPDES permit (Order No. 94-129). CDO No. 94-015 is referenced in Order No. 94-129. This CDO establishes the same final selenium compliance requirements for Tosco, as specified in CDO No. 94-015 for Unocal.

4. On February 20, 1991, the Regional Board issued Order No. 91-026 amending the dischargers' National Pollutant Discharge Elimination System (NPDES) Permits to include a concentration-based effluent limitation for selenium of 50 ppb (daily maximum) and a mass-based effluent limitation, expressed in pounds per day, equivalent to 50 ppb times the flow rate for each discharger, as determined on an annual average basis. These limitations, referred to as Individual Control Strategies (ICS), were issued to the dischargers pursuant to state authority under the NPDES program and as a result of the "short listing" of San Pablo Bay, Carquinez Strait and Suisun Bay (hereinafter generally referred to as "the Bays") under section 304(l) of the federal Clean Water Act as impaired water bodies for selenium. The listing decision was made by the U.S. Environmental Protection Agency (USEPA) on September 28, 1990.

5. On June 19, 1991, the Regional Board issued Order No. 91-099, further amending the dischargers' NPDES permits to include immediately effective interim selenium discharge limits calculated on the basis of each refinery's "current performance," imposed in Order No. 91-026.

6. In 1987, the USEPA promulgated water quality criteria for selenium, based on the protection of aquatic life, of 5 ppb for fresh waters, and 71 ppb for marine waters, as four day average values. On December 22, 1992, the USEPA issued a final rule (40 CFR 131.36), also known as the National Toxics Rule, which established a criteria of 5 ppb for the waters of San Francisco Bay to and including Suisun Bay, and the Sacramento-San Joaquin Delta. The final rule states that "the fresh water selenium criteria are included for the San Francisco Bay estuary because high levels of bioaccumulation of selenium in the estuary indicate that the salt water criteria are under protective for San Francisco Bay". This rule became effective February 5, 1993.

7. The effluent limitations imposed under Order No. 91-026 became effective on December 12, 1993. For reasons explained below, the dischargers were not able to achieve compliance with the selenium limits by the effective date, and violated the order. The Regional Board adopted CDO No. 94-015 to enforce the provisions of Order No. 91-026.

8. The Western States Petroleum Association ("WSPA") and the six Bay Area refiners (Shell, Unocal, Exxon, Chevron, Tosco and Pacific Refining) filed a Petition for Review with the State Water Resources Control Board on March 22, 1991, challenging the issuance of the Individual Control Strategies (ICS's) and the underlying listing of the Bays under Section 304(l) of the Clean Water Act on the grounds that the "applicable water quality standard," as defined under section 304(l), was not violated in the Bay and that the Board's action in issuing the ICS's was unlawful and improper. Petitions for Review were also filed by Communities for a Better Environment and the Pipe Trades Council of Northern California. On September 16, 1992, the State Board dismissed without prejudice all Petitions for Review, stating that the Regional Board was scheduled to consider the issues raised in the petitions, including site-specific objectives for selenium in the designated water bodies and schedules for compliance with the objectives.

9. On October 16, 1992, WSPA and the six Bay Area refineries filed a Petition for Writ of Mandate in Superior Court for the County of Solano, seeking to set aside the ICS's and the underlying Clean Water Act listing of the Bays. This action was dismissed upon the adoption of CDO No. 94-015.

10. In 1987, Chevron was required to determine the source of selenium in its effluent and develop all reasonable measures to limit selenium discharge as a condition of its NPDES permit. In 1990, Shell, Unocal, Exxon, and Pacific Refining were required to investigate and evaluate all feasible source control measures, process changes, and treatment options for reducing selenium effluent concentrations to 1, 10, and 50 ppb pursuant to their NPDES permits. These studies determined that the primary source of selenium in refinery effluent was the crude oil. A natural component of the crude, selenium is found in varying levels in different types of crude. The heavy crudes produced in the San

Joaquin Valley of California contain high concentrations of selenium (~ 400-600ppb) relative to crudes from other parts of the world (~ 50-250 ppb). For the most part, the Bay Area refineries have been designed to use San Joaquin Valley heavy crude for a significant percentage of their total crude intake.

11. The Regional Board reviewed information presented by the Shell, Unocal and Exxon, and has determined that a combination of process and treatment options are the most likely means of achieving the required loading reductions in the shortest period of time. This conclusion was based on an estimate that the maximum possible emission reduction that could be achieved by crude substitution would likely be less than required loading reductions, would take longer to accomplish, and would result in adverse economic impacts to oil producers and the surrounding community, compared to the proposed treatment technology implementation schedule.

12. At the time CDO No. 94-015 was issued, there were two known technologies that showed promise: iron co-precipitation and selective resin adsorption. The iron co-precipitation technology would generate very large quantities of selenium-laden sludge (as much as 14 tons per day, depending on the refinery) which would be classified as hazardous waste by California. The regulated sludge would be subject to land disposal restrictions under the California's Hazardous Waste control Law, and would itself have to be treated to remove or stabilize the selenium prior to land disposal. In addition, at the time CDO No. 94-015 was issued, bench- and pilot-scale testing of the above two technologies indicated that neither was effective in reducing selenium in refinery wastewater to 50 ppb on a consistent basis for all refineries.

13. Since issuance of CDO No. 94-015, WSPA has completed a $1.3 million research study (hereinafter called the "Technology Study") in a further, more comprehensive effort to identify a technology or technologies that are capable of removing selenium from refinery wastewater in a reliable and environmentally acceptable manner. The Technology Study consisted of selenium speciation studies, selenium source studies, selenium fate studies, and selenium removal studies, as described below:

    a. The first phase of this project characterized the selenium in sour water and stripped sour water, as well as refined techniques for quantifying the selenium species most likely to be present. Knowledge of the selenium species is critical to developing and improving the effectiveness of promising selenium removal processes. Speciation work under the WSPA study began in August 1993. Procedures have been developed and tested on effluent samples for fractionation, and quantification of various selenium forms (particulate selenium, neutral- and acid-volatile selenium, and anionic selenium species-selenite, selenate, and selenocyanate). SSW and final effluent samples have been analyzed using the speciation method developed.

b. The process development studies were intended to identify, develop, and demonstrate improvements in the most promising processes that would render them feasible as well as effective, including several of the various iron processes (ferric co-precipitation on SSW and biotreater effluent, elemental iron treatment of SSW, and the Unipure process on SSW), alumina (Sorbplus treatment of SSW, and activated alumina treatment of SSW and final effluent), and ion exchange processes.

c. For the iron process, a suitable pretreatment process (eg. chemical oxidation) for the SSW stream is necessary to convert the selenium into the proper species for sorption onto the iron. Treatment of the SSW stream instead of the final effluent would allow for a significant reduction in the volume of water to be treated, and the amount of sludge generated. Preliminary tests conducted by one refinery indicate that sludge washing at high pH may remove greater than 95% of the selenium sorbed to the spent iron sludge.

d. The WSPA effort included a study of biological treatment options for selenium removal. Two approaches were evaluated-an anaerobic system that converts selenate and selenite to elemental selenium, and an aerobic system that converts selenite into cell-bound elemental selenium. The latter has the potential to be used as part of an aerobic treatment system treating selenium-containing stripped sour waters. WSPA selected a contractor for these studies during spring 1994.

e. These studies were completed, and a final report was issued in 1995.

14. At the conclusion of the study, each refiner selected an appropriate technology (or technologies) for pilot evaluation based on its effectiveness, feasibility, and cost. Pilot-scale testing was performed on-site at each refinery, and managed separately by each individual refiner. Pilot test results were shared and reported on a regular basis to the Regional Board. Pilot testing, including design, construction, operation and reporting lasted approximately one year. The refineries are in various phases of design, engineering, construction and start-up of their full-scale selenium removal units.

15. WSPA convened a Task Force for the purpose of monitoring the progress of the Technology Study. Staff at the Regional Board participated in the Task Force.

16. The Regional Board proposed an amendment to the Water Quality Control Plan for the San Francisco Bay Region (Basin Plan) which would establish an industry wide, mass emission reduction strategy (MERS) for selenium, which is targeted at a level below 50 ppb. The schedule for selenium reductions in the MERS, if adopted, or in any other amendment to the Basin Plan, will not be inconsistent with the schedule for compliance contained in this Order.

17. The Regional Board, WSPA, and Shell, Unocal, and Exxon reached a settlement of the litigation described in Finding No. 9. That settlement includes a term providing that Shell, Unocal, and Exxon shall pay the Regional Board the sum of $1 million within 30 days of adoption of CDO No. 94-015, and $1 million on January 31, 1995.

18. Order No. 94-129 (NPDES No. CA0005053), which now applies to Tosco Refining Company as the current owner of the San Francisco Area Refinery in Rodeo, that was formerly owned by Union Oil Company, states:

2. The Discharge of Waste 002 containing selenium constituents in excess of the following limits is prohibited:

Concentration Limit: (daily maximum) (3)(4)	Mass Emission Rate: (running annual average) (3) (4)
50 μg/L	0.85 lb/day 0.39 kg/day

(3) These limits are effective immediately. Pending compliance with the 50 μg/L selenium limit, the Discharger shall comply with a mass emission rate of 5.60 lb/day (2.55 kg/day) as a running annual average as required by the Settlement Agreement and Cease and Desist Order No. 94-015 referenced above.

(4) Mass emission rate for selenium shall be based on running annual averages. Running annual averages shall be calculated by taking the arithmetic average of the current daily mass loading value, and all values for the previous twelve months.

19. Tosco Refining Company is discharging and threatens to continue discharging selenium in violation of the concentration limit of 50 μg/L (ppb) (daily maximum), and mass emission limits of 0.85 lb/day and 0.39 kg/day (running annual averages) for selenium in Order No. 94-129. The Regional Board is adopting this Order to enforce these provisions of Order No. 94-129.

20. This Order is an action to enforce the laws and regulations administered by the Regional Board. This action is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15321, Title 14, California Code of Regulations.

21. The Regional Board has notified the discharger, and interested agencies and persons of its intent under California Water Code Section 13301 to consider the adoption of a Cease and Desist Order for the discharge, and threatened discharge, and has provided them with

an opportunity for a public hearing, and an opportunity to submit their written views and recommendations.

22. The Regional Board, in a public hearing, heard and considered all comments pertaining to the discharge, and threatened discharge.

IT IS HEREBY ORDERED, pursuant to Section 13301 of the California Water Code, that the Tosco Refining Company, San Francisco Area Refinery at Rodeo, shall cease and desist from discharging waste in violation of Order No. 94-129 (NPDES No. CA0005053) by complying with the following:

1. Compliance with this Order shall be in accordance with the following tasks and time schedules:

    a. The discharger shall implement a removal technology or technologies, or an alternate control strategy, which has been determined by the discharger to be capable of achieving compliance with the concentration limit of 50 ppb (daily maximum) and mass emission limits of 0.85 lb/day and 0.39 kg/day (running annual averages) for selenium in Order No. 94-129, and shall comply with these limits, no later than July 31, 1998.

2. In the event the discharger is successful in identifying and piloting a workable selenium removal technology or other control strategy in advance of the schedule set forth in Provision 1, the discharger shall, to the extent feasible, accelerate the implementation of such technology or control strategy so as to achieve compliance with the 50 ppb limit in advance of the July 31, 1998 deadline.

3. In the event the discharger is unable by July 31, 1998, to identify or implement a workable removal technology or other control strategy, either through the Technology Study or its own internal efforts, an extension of the final compliance date will be considered, and may be granted based on information regarding technological availability and demonstration of a good faith effort to achieve compliance.

4. During any period of extension granted under Provision 3, the discharger shall continue to use all reasonable efforts to identify or implement a workable selenium removal technology or other control strategy, consistent with the efforts required by this Order. The discharger shall provide the Regional Board with quarterly status reports on its progress in achieving compliance.

5. If the discharger fails to comply with the provisions of this Order, the Executive Officer is authorized, after approval of the Regional Board Chairman, to request the Attorney General to take appropriate action against the dischargers. This shall include injunctive and civil remedies, if appropriate, or the issuance of a Complaint for Board consideration

of Administrative Civil Liabilities.

6. The discharger shall maintain a copy of this Order at its facility so as to be available at all times to facility operating personnel.

7. If the discharger is delayed, interrupted or prevented from meeting one or more of the time schedules in this Order due to circumstances beyond their reasonable control, the discharger shall promptly notify the Executive Officer. In the event of such delays, the Regional Board will consider modification of the time schedules established in this Order.

8. This Order shall be effective on May 21, 1997.

I, Loretta K. Barsamian, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order of the California Regional Water Quality Control Board, San Francisco Bay Region, on May 21, 1997.

Loretta K. Barsamian
Executive Officer